

A CASE STUDY: PATIENT-CENTERED HOSPITAL DESIGN

by

Kei-Tung (Tony) Liu

BS Biological Science, University of California, Merced, 2015

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This essay is submitted

by

Kei-Tung (Tony) Liu

April 19, 2019

and approved by

Essay Advisor:

Samuel A. Friede, MBA
Assistant Professor
Health Policy and Management
Graduate School of Public Health
University of Pittsburgh

Essay Readers:

Caroline Kolman, MBA
Adjunct Professor
Swanson School of Engineering
University of Pittsburgh

Jeffrey Carlson, MBA
Interim CEO
Allegheny Valley Hospital
Allegheny Health Network
Pittsburgh, Pennsylvania

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ABSTRACT

Health care is a dynamic industry constantly shaped by external factors such as governmental regulations, competitions, and consumer trends. Today, as health care consumers become more informed and engaged in their medical care than ever before, health care organizations are focusing on improving the patient experience. Allegheny Health Network, a multi-hospital health system, is currently building a 160-bed hospital in Wexford, Pennsylvania to provide patient-centered care to their communities. The patient-centered design of Wexford Hospital includes a variety of unique facility and technology features such as the rooftop garden, smart television, mobile app, and patient room control. The purpose of this paper is to evaluate the patient-centered design of Wexford Hospital by comparing the various features as well as the workflow design to 8 different dimensions of patient-centered care. Overall, the Wexford Hospital design addresses all the dimensions and provides a patient-centered experience from arrival to discharge.

PUBLIC HEALTH RELEVANCE

In relation to health care, one of the major focuses of public health is the Triple Aim. It is part of the national strategy for addressing the health care issues of population health, experience of care, and per capital cost. Patient-centered care is an evidence-based approach to health care that aligns with the Triple Aim by improving the experience of care and reducing costs.

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1.0 INTRODUCTION

Traditionally, health care for patients had been strictly focused on the medical treatments. Patients went to the hospital for medical care without expecting a hotel-like experience. In fact, patient satisfaction was not much of a concern or focus. Patients were simply expected to do what the health care professionals instructed them to do (Conklin, 2002). But over the years, this traditional view on health care has changed significantly due to the rise of health care costs and the gradual shift from fee-for-service to value-based care model. Today, terminologies such as patient experience, patient satisfaction, and patient-centered care are part of the conversation of every health care organization. In fact, patients are now being called consumers of health care. They are more engaged in their well-being than ever before (Domecq et al., 2014). As a result, health care organizations are investing large amounts of financial and human resources to design and create health care experiences that are individualized for every patient.

The purpose of this paper is to evaluate the patient-centered design of Allegheny Health Network Wexford Hospital by highlighting various features as well as the workflow design and comparing them to the 8 dimensions of patient-centered care. Although the Wexford Hospital will offer outpatient services through their ambulatory care center, this paper will focus mainly on the in-patient experience.

1.1 ALLEGHENY HEALTH NETWORK

Allegheny Health Network (AHN) is a not-for-profit integrated health system within Highmark Health that provides comprehensive health services to communities all over the Western Pennsylvania. It consists of 7 current hospitals, 5 new hospitals (in-construction), 8 outpatient surgery centers, 4 pavilions, and other facilities. AHN aims to improve health and promote wellness in the communities by bringing health care closer to homes.

1.1.1 WEXFORD HOSPITAL

AHN is currently in the process of building a new 160-bed full-service hospital at Wexford, PA (Figure 1) that will be directly connected to their existing Wexford ambulatory care center. Together, these two facilities will provide a wide range of health care services to a combined population of 215,000 that includes Wexford, McCandless, Cranberry, Mars, Gibsonsia, Allison Park, Zelienople, Franklin Park, and other surrounding communities, all under one roof. The new Wexford Hospital is designed to provide high quality patient-centered care from start to finish. Services that will be offered at the Wexford campus includes dedicated women's health services, advanced cardiac care, neurosurgical care, orthopedic care, cancer care, emergency care, physical therapy, advanced imaging, primary care, and many others.



Figure 1: Allegheny Health Network- Wexford Hospital

2.0 LITERATURE REVIEW

2.1 DEFINING PATIENT-CENTERED CARE

In 2000, the Institute of Medicine published an influential book titled *Crossing the Quality Chasm* (Corrigan, 2005). In this book, patient-centered care was highlighted as one of the six key elements of high-quality health care. Although the importance of patient-centered care has been widely acknowledged, the concept itself and its dimensions have not been universally defined. Epstein et al. (2005) defined the term patient-centered care as a combination of actions in service of patient-centeredness, including interpersonal behaviors, technical interventions and health systems innovations, while other scholars have slightly different perspectives on the dimensions of patient-centered care (Table 1).

For the purpose of this paper, the dimensions of patient-centered care defined by Gerteis et al. (1993), which later adopted by the Picker Institute, will be used to evaluate the patient-centered design of the AHN Wexford Hospital. A brief description of each of the dimensions is as follow:

1. Respect for patients' preferences

Care that is patient-centered should correspond to the needs, wants, and preferences of the individual patient. It should be highly customizable and provide patients the opportunities to be part of the decision making for their health care.

2. *Coordination and integration of care*

Care coordination among providers and the timeliness of care are two important factors that affect clinical outcomes and the patient experience. It requires proper and efficient communication between providers, patients, and staffs and making sure that adequate and appropriate care is given to the patient at every checkpoint.

3. *Information and education*

Patients who seek care want to be informed and educated about their disease, treatments and what they can do to better their health. Therefore, it is important for providers to ensure that their patients know what is going on and that relevant health information is transparent and available to them.

4. *Physical comfort*

The physical comfort component of patient-centered care focuses on the care provided to patients to adequately manage their pain, breathing difficulties and any other discomforts.

5. *Emotional support*

A patient's well-being is more than just their physical comfort. Being sick is an unpleasant situation that is often associated with increased stress, fear and anxiety. Therefore, care that is patient-centered needs to address the emotional needs of the patients in addition to their physical needs.

6. *Involvement of family and friends*

Family and friends are often the patient's largest pillar of support during his/her time of care. They act as caregivers, decision makers and are part of the patient's experience. Therefore, true patient-centered care must include the patient's family and friends by supporting them in their roles and keeping them informed about the patient's care.

7. *Continuity and transition*

This dimension of patient-centered care focuses on the transition between in-patient and post-discharge care. It is a shared interest of both the provider and patient to ensure a smooth recovery and better health outcome post-treatment. This involves educating the patient and providing them with the resources they need to improve, coordinate any follow-up treatments and visits, and provide patients the access to clinical, social, physical and financial support that they might need moving forward.

8. *Access to care*

This dimension focuses on how easily the patients can access the care when it is needed. It encompasses the location of the health care facility, the ease of scheduling appointments, the availability of appointments when needed, and the accessibility to specialists.

Table 1: The Various Dimensions of Patient-Centered Care

Authors	Dimensions of Patient-Centered Care
Mead & Bower (2002)	<ol style="list-style-type: none">1. Biopsychosocial perspective- a perspective on illness that includes consideration of social and psychological factors2. The “patient-as-person” – understanding the personal meaning of the illness for each individual patient3. Sharing power and responsibility – sensitivity to patients’ preferences for information and shared decision-making and responding appropriately to these4. The therapeutic alliance- developing common therapeutic goals and enhancing the personal bond between doctor and patient5. The “doctor-as-person” -awareness of the influence of the personal qualities and subjectivity of the doctor on the practice of medicine.
Stewart et al. (1995)	<ol style="list-style-type: none">1. Exploring the disease and the illness experience2. Understanding the whole person3. Finding common ground regarding management4. Incorporating prevention and health promotion5. Enhancing the doctor-patient relationship “Being realistic” about personal limitations and resources
Epstein et al. (2005)	<ol style="list-style-type: none">1. Considering patients’ needs, wants, perspectives and individual experiences;2. Offering patients opportunities to provide input into and participate in their care3. Enhancing partnership and understanding in the patient-physician relationship.
Gerteis et al. (1993) and the Picker Institute	<ol style="list-style-type: none">1. Respect for patients’ preferences2. Coordination and integration of care3. Information and education4. Physical comfort5. Emotional support6. Involvement of family and friends7. Continuity and transition8. Access to care

2.2 BENEFITS OF PATIENT-CENTERED CARE

From operations design to patient experience, care coordination to patient safety, “patient-centered” is a term that is widely used throughout health care. Therefore, it is important that we understand the benefits of patient-centered care and why it is such a big focus to many health care organizations. Numerous studies have examined the effects of patient-centered care on health status, outcomes and patient satisfaction. Majority of the research found that patient-centered care is associated with better clinical outcomes, improved patient satisfaction and results in quality measures such as hospital length of stay, readmission rates, and number of hospital-acquired infection. In fact, patients that are more informed and engaged in their own care tend to have better disease-related health outcomes, emotional well-being, pain-control, lower level of discomfort, and require fewer diagnostic tests and referrals for additional care (Epstein & Street Jr, 2007; Epstein et al., 2010; Kaplan et al., 1989; Lewin et al., 2001; Oates et al., 2000).

A significant component of patient-centered care model is physician-patient communication. A study by Street Jr. et al. (2009) laid out multiple pathways to which communication improves health outcomes (Figure 2). When a physician and a patient communicate effectively and exchange information, a relationship is formed. As a result, the patient is more engaged in their care and willing to trust their provider. An engaged patient is more willing and likely to commit fully to their treatment and consequently has better health outcomes.

Furthermore, organizations that have incorporated patient-centered design into their facilities tend to see significant improvement in their financial and quality measures. Some examples included the Griffin Hospital, Sharp Coronado Hospital and Aurora Health (Charmel

& Frampton, 2008). Griffin Hospital, a 160-bed community hospital in Connecticut, credited their increased patient volume, decreased average length of stay, and reduced cost per case to their patient-centered model of care program. Similarly, Sharp Coronado Hospital, a 204-bed hospital located near San Diego, received a significantly higher patient and community satisfaction 5 years after the implementation of patient-centered practices throughout their organization.

Like Griffin Hospital and Sharp Coronado Hospital, in addition to implementing patient-centered programs to 6 of their 13 hospitals, Aurora Health also designed and built their new hospital under a patient-centered model. The return on investment was significant, with marked improvements in both patient and employee satisfaction and higher HCAHPS scores compared to their non-patient-centered sites. Successful stories like the Griffin Hospital, Sharp Coronado Hospital, and Aurora Health are evidence of both the financial and quality of care benefits in adopting patient-centered care models.

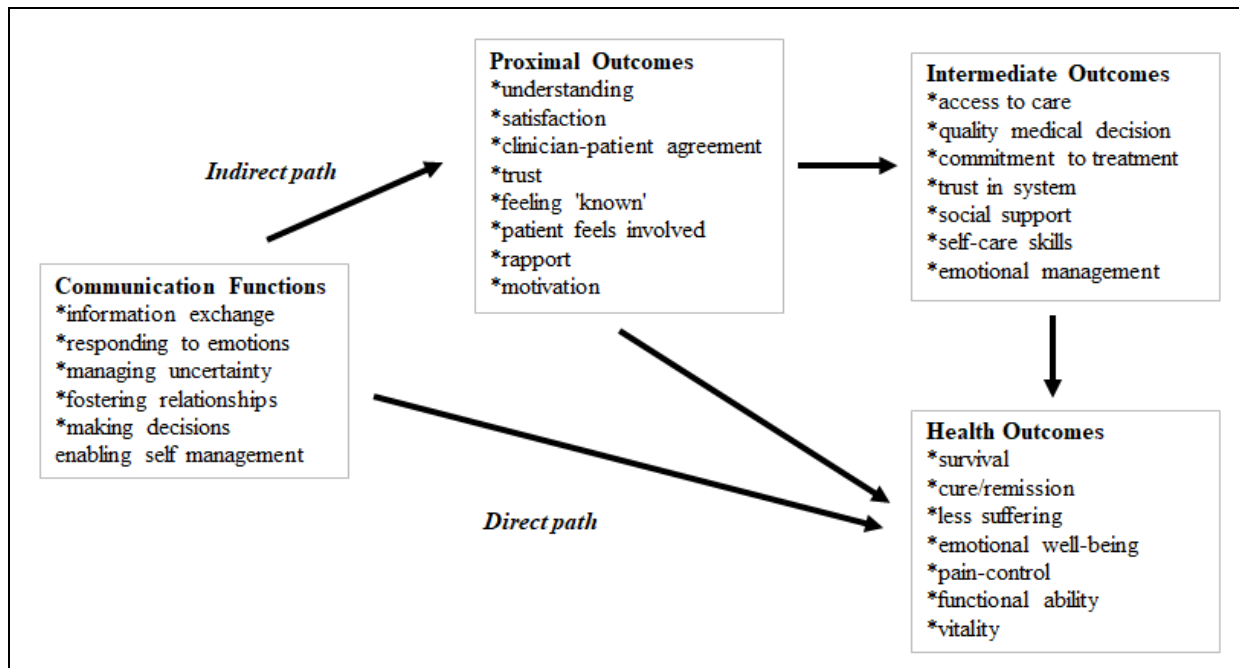


Figure 2: Direct and Indirect Pathways from Communication to Health Outcomes

Adapted from Street Jr. et al. (2009, p.295-301).

3.0 AHN WEXFORD HOSPITAL PATIENT-CENTERED CARE DESIGN

There are three major components to the Wexford Hospital patient-centered care design: technology, workflow, and facility design. Technology such as smart TV, digital status display, and mobile app enhances patient-provider communication and allows patient to be a part of their care experience. Workflow design that focuses on efficiency and coordination of care is essential to patient-centered care. Additionally, a well-designed facility is needed to support the workflow and create an environment that promotes physical and emotional comfort to the patients as well as their family members. These three components are interrelated, and they function together to address the needs and preferences of the patient and create a health care experience that improves outcomes and satisfaction (Figure 3).

True patient-centered care is not an episode of event but rather, a continuum of care and a memorable experience from arrival to discharge. Therefore, to evaluate the patient-centered care design of the Wexford Hospital, we will follow the patient journey from start to finish. We will highlight features and design concepts that will be utilized throughout the hospital and evaluate them based on the 8 dimensions of patient-centered care defined in a previous section. In addition, rather than discussing in detail the workflow of every department, a brief description of the workflow design is included to highlight purposeful actions that were taken to ensure patient-centeredness.

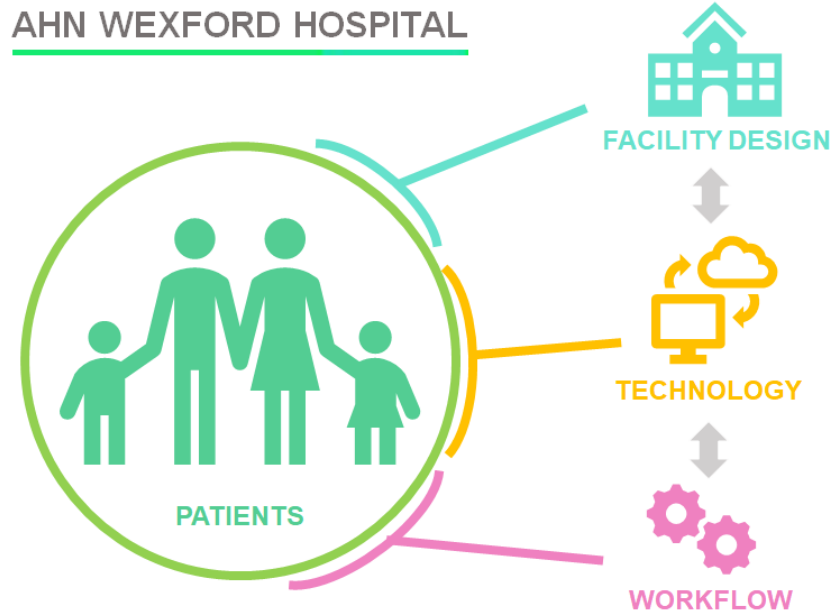


Figure 3: Patient-Centered Design

3.1 ARRIVAL

At the Wexford Hospital, patient experience begins prior to the patient's arrival. A patient who seeks care can utilize AHN's mobile app to acquire information about the Wexford Hospital, including hours, services, and directions. In addition, a patient can utilize the app to check-in similar to airline services. Upon arrival, free complementary valet parking is available to the patient and their family. The mobile app then automatically notifies the information system that the patient has arrived. At the entrance, the patient is assisted by a greeter and directed to the appropriate location for services. The purpose of these features is to simplify the arrival experience that is often stressful and complicated.

Aside from the concierge-like experience, the facility design of the hospital lobby also creates a welcoming environment for the patient. Features such as a warm fireplace, a grand

piano, as well as community-themed artwork transform a traditional hospital experience into something more familiar and home-like (Figure 4). In addition, the facility design also includes a café with healthy and allergy-sensitive options, a spacious outdoor courtyard, and charging stations that satisfy the needs and preferences of hospital guests.

The emergency department is a major part of the patient experience at a hospital. For patients who arrive at the Wexford Hospital emergency department, in addition to the aesthetic environment, a bed-side registration process is in-placed to minimize wait time and promote timeliness of care. To further ensure timeliness of care, the emergency department is designed to be in proximity to the imaging and laboratory departments to allow for more efficient workflow and better coordination of care. Overall, the combination of user-friendly technology, non-traditional interior hospital design, attractive amenities, as well as efficiency-driven workflow establishes a patient-centered care experience that is welcoming and supportive for patients and family members.



Figure 4: Wexford Hospital Hotel-Like Lobby

3.2 IN-PATIENT

The design of a patient room is vital to the in-patient experience. Patient rooms of the Wexford Hospital come with a number of unique features. Outside every patient room, there is a digital display that shows the patient status, such as fall risk and other information that are helpful to the caregivers. The display of patient status enhances the coordination of care as well as patient safety. Each patient room is equipped with a variety of technology. Using a set of controls, patients have the ability to adjust various aspects of their environment including lighting and temperature. This enables patients to be comfortable in their environment as well as have control over their care experience. Moreover, as an extension to traditional nurse call bells, patients can utilize the mobile app to send text messages to nurses as a way of efficient and timely communication during their in-patient stay.

In addition, each patient room is installed with a smart TV that enables access to care information as well as connection to services based on their needs. The smart TV is capable of displaying information about the caregivers, scheduled tests, and other health information. It has telemedicine capabilities that connect patients to providers. Furthermore, patients can utilize the smart TV to access entertainments as well as room service menu options based on their dietary restriction. Meal options are displayed using CBORD application, a comprehensive technology that is capable of filtering meal items based on the patient's macromolecule counts and allergy sensitivities. This ensures patients receive the right amount of nutrients that complement their treatment plan and health status. Other features included bedside connection to the patient's electronic health record (EHR), in-room educational capabilities, and ample space to accommodate visitors.

Labor, delivery, recovery and postpartum (LDRP) is one of the major specialties of the Wexford Hospital. In addition to being spacious, rooms of the LDRP unit have purposefully designed large glass windows to allow more natural light. Furthermore, a roof top garden is included in the facility design to provide a scenic outdoor environment for patients recovering from labor and delivery. In addition, comprehensive meal services are available to LDRP patients based on their needs, preferences, and cravings.

To further support the needs of the patients and their family members, family areas are available for family members to interact and hang out. To accommodate patients' spiritual needs, a meditation room is included in the facility design to provide a quiet place for individuals to pray and meditate. Because family is a big part of the patient experience, visitors can utilize the AHN app to receive live updates on the patient's surgery status. This allows visitors to utilize other amenities such as the cafeteria and outdoor courtyard while they wait for their loved ones.

3.3 DISCHARGE

Hospital discharge is a big part of the patient experience and can affect patient satisfaction as well as hospital readmission rates. The Wexford Hospital offers a wide range of complementary services that are designed to create a seamless hospital discharge experience. One helpful feature is the "meds-to-beds" service. With "meds-to-beds", patients no longer need to pick up their prescription at the local pharmacies, instead, their medications are delivered right to their bed. Furthermore, this provides an opportunity for pharmacy staff to educate patients on their medications. The combination of "meds-to-beds" and medication education helps ensure that patients have the medications they need before leaving the hospital. For patients and visitors

that utilizes valet parking, their vehicles can be ready for them ahead of time upon request. Overall, these features help create a discharge process that is efficient and timely. Lastly, as part of the continuum of care, every patient leaving the hospital will receive a follow-up discharge phone call to ensure that their health care needs are met.

3.4 WORKFLOW DESIGN

Facility design and technology are like the leathered seats, high-end navigation system, and safety features of a luxury car; they are all meaningless without the driver. In a similar sense, workflow processes are the components that drive patient-centered care as well as the operations of a hospital. Without a purposefully-designed workflow, patient-centered care cannot be achieved. In the following paragraphs, we will discuss some of the methods and tools used to design the Wexford Hospital workflow.

As a contributing member of the Wexford Hospital operations team as well as an administrative resident, the author of this paper had the opportunity to be a part of the design process, especially in creating process maps for various departments of the hospital, such as the emergency department (ED), women's health, and environmental services. One significant approach to workflow design was the involvement of multidisciplinary teams. Nurses, physicians, managers, and leaders from various AHN hospitals participated in the design sessions. When creating future-state process maps, cross functional workstreams were identified and analyzed to ensure efficient coordination of care. Potential areas for innovation were also noted to maximize efficiency and safety. Subsequently, the process maps were utilized in the

facility design planning to ensure that the physical building and facility layouts support the workflow.

For example, to design a patient-centered ED workflow, subject matter experts from pre-hospital services, behavioral health, patient access, ED, nursing, and transport services were invited to provide feedback on the workflow between ED and other departments such as imaging, behavioral health units, and LDRP. In addition, inputs were gathered about the current processes by the administrative resident to create a define-phase process map. After the initial process map was created and confirmed with the SMEs, additional workflow sessions were conducted to brainstorm what the ideal workflow should be by discussing areas for improvement and potential use of technology to enhance or replace certain steps of the process such as check-in and ED triage. The resident then incorporated the input to create the future-state process maps that will be utilized throughout the development of the hospital.

Once the process maps had been created, they were evaluated and tested. To ensure patient-centered care, physical mock-ups of the patient rooms and operating rooms were constructed to examine the workflow as well as the room design. Utilizing the Simulation, Teaching, and Academic Research (STAR) Center of AHN, different care scenarios and situations of emergency were simulated and assessed by various nurses and physicians. The use of simulations helped assure that the care will be patient-centered, efficient, and safe. Additionally, the STAR Center will also be used to prepare new employees for delivering patient-centered care. New employees, especially clinicians, will be trained in various operational scenarios using smart mannequins, physical mock ups, and the established workflow to ensure a seamless care experience.

4.0 EVALUATION

To evaluate the patient-centered design of AHN Wexford Hospital, technological, facility, and workflow design features are categorized into each of the dimension of patient-centered care (Table 2).

4.1.1 Respect for Patient's Preferences

Because patients have diverse needs and wants, providing options and autonomy is often the key to their satisfaction. The unique features of AHN Wexford Hospital provide options that satisfy the needs and preferences of the patients as well as other hospital guests. Technology such as patient room control, smart TV, and mobile app give patients the ability to control their environment as well as their care experience. In addition, the non-traditional amenities such as rooftop garden, meditation room, lactation rooms, and healthy café transform a dull and generic hospital experience into a hotel-like customer focused experience.

4.1.2 Coordination and Integration of Care

Coordination of care is a big component of the Wexford Hospital workflow design. By collaborating clinicians and multidisciplinary teams in the design process, it ensures that processes are efficient and patient care paths are well coordinated. Furthermore, the use of

simulation and physical mock-ups of hospital rooms enables effective assessment and improvement of the workflow. In addition, through the utilization of technology such as the smart TV and digital status display, clinicians and staffs can be more connected in their care for the patients.

A major advantage of designing a new facility is being able to determine the relative locations of the various departments and units to maximize efficiency and coordination of care. Facility design is a significant opportunity for allowing more coordinated and integrated care. The Wexford Hospital facility layout is designed to be patient-centered by ensuring that complementary departments such as ED and imaging; surgical and post-operative units are proximal to each other to allow efficient workflow and patient movement from one location to the other.

4.1.3 Information and Education

Because patients want to be a part of their care and take control of their health, education and information transparency are major patient satisfiers. AHN Wexford Hospital promotes communication, education, and accessibility to information by leveraging technology and incorporating effective and timely education into the day-to-day workflow. Technology such as smart TV and mobile app provides channels for patients to acquire information as well as communicate with their providers. One of the features related to the discharge process mentioned was medication education. By having pharmacists provide the medication education, patients may receive the most accurate information about their prescriptions and more likely to comply with their medication plans.

4.1.4 Physical Comfort

The physical comfort dimension of patient-centered care focuses on pain management and other discomforts. Although the workflow process of pain management is not specified in this study, both the patient room control feature and workflow design take into account the physical comfort and needs of the patient.

4.1.5 Emotional Support

Being sick is both a physically and emotionally draining experience. In the perspective of patients, they do not want to be in a hospital. However, unlike traditional hospitals, AHN Wexford Hospital is designed to have a mixture of home and hotel-like feel; the emotional support aspect of patient-centered care is embedded in the very design of the facility. The fireplace, the piano, and the community-themed artwork all help to create a sense of familiarity that supports the patients' emotional wellbeing. Furthermore, the inclusion of a meditation room provides patients as well as family a quiet place to fulfill their spiritual needs, which also have a great impact on their emotional status.

4.1.6 Involvement of Family and Friends

Wexford Hospital promotes and engages family and friends involvement in the patient care through the facility design. Amenities such as family areas, an outdoor courtyard, and ample patient rooms allow loved ones to be a part of the patient experience. In addition, the ability to receive mobile updates on patient surgery status can help family feel more connected and

involved in the patient care. Furthermore, the design of workflow ensures that family members are included in the care decisions for the patient.

4.1.7 Continuity and Transition

Wexford Hospital supports post-discharge recovery and continuity of care through meds-to-beds services, medication education, as well as post-discharge communication. In addition, by introducing discharge planning earlier in the admission process, it further ensures a successful transition and continuity of care in terms of education, post-discharge care, and the coordination of follow-up appointments. Moreover, the facilities integration between the hospital and the ambulatory care center eases the transition from in-patient to outpatient care.

4.1.8 Access to Care

The facilities integration creates a one-stop health care that increases patient access to care. Instead of traveling to multiple locations, patients can acquire all the care they need, both in-patient and outpatient, close to home.

Table 2: Patient-Centered Features of the AHN Wexford Hospital

Dimensions of Patient-Centered Care	AHN Wexford Hospital
Respect for Patients' Preferences	<ul style="list-style-type: none"> • Smart TV • Patient room control • CBORD Dietary Menu • Mobile app • Rooftop garden • Meditation room • Lactation room • Healthy food options • Charging stations • Complementary valet parking • Meds-to-beds • Workflow design
Coordination and Integration of Care	<ul style="list-style-type: none"> • Patient room digital status display • Smart TV • Bedside connection to patient's EHR • Department layouts • Simulations • Workflow design
Information and Education	<ul style="list-style-type: none"> • Smart TV • Workflow design
Physical Comfort	<ul style="list-style-type: none"> • Patient room control • Workflow design
Emotional Support	<ul style="list-style-type: none"> • Meditation room • Home-like lobby • Workflow design
Involvement of Family and Friends	<ul style="list-style-type: none"> • Mobile surgery updates • Family areas • Outdoor courtyard • Ample space and room design • Workflow design
Continuity and Transition	<ul style="list-style-type: none"> • Meds-to-beds • Workflow design • Post-discharge Phone Call
Access to Care	<ul style="list-style-type: none"> • Telemedicine capabilities • Wexford Health + Wellness Pavilion • Workflow design
<i>Note:</i> Orange represents technology related features. Blue represents facility design features. Purple represents workflow design.	

5.0 CONCLUSION

Health care is more than an episode of care or a set of prescriptions, it is an experience involving clinicians, patients, and family. Patient-centered experience is associated with better health outcomes, lower costs, and higher patient satisfaction. The Allegheny Health Network's 160-bed Wexford Hospital is designed to provide a patient-centered experience utilizing unique facility and technology features such as a home-style lobby, rooftop garden, smart TV and mobile nurse call system. In addition, the multidisciplinary approach to workflow design further ensures that patient care will be efficient and well-coordinated.

Overall, the Wexford Hospital patient-centered design satisfies the 8 dimensions of patient-centered care published by the Institute of Medicine. It takes into account the needs and preferences of the patients by providing them with a variety of amenities as well as allowing them to be involved in their care.

5.1 CHALLENGES AND LIMITATIONS

Several challenges were encountered in relate to designing the workflow. Although there are benefits to utilizing a multidisciplinary approach, identifying the best workflow can be challenging when subject matter experts do not necessarily share the same opinions on what the correct processes should be. In addition, the use of physical mock-ups was limited to specific

rooms and departments, therefore unable to validate workflow between departments and units. Most importantly, this case study does not evaluate the effectiveness of the Wexford Hospital patient-centered design as the hospital is still currently under-construction. Further evaluation will be needed, once the hospital is built, to validate the effectiveness of the patient-centered design.

5.2 ACKNOWLEDGEMENT

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